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UNITED STATES PATENT APPLICATION  
FOR  
SPRUNG SURFACE HANDLE

Inventor:  
Roger P. Willems

Freilich Hornbaker & Rosen  
10960 Wilshire Boulevard  
Suite 1220  
Los Angeles, California 90024  
Telephone: 310 477-0578

## SPRUNG SURFACE HANDLE

### Summary of The Invention

[0001] Sprung surface handles having arms, for flat surfaces, such as the flat end of a trunk, or box, are well-known in the art, such as Koll U.S. Patent No. 1,715,243, for a Handle Assembly, patented June 1, 1953. These sprung surface handles protrude from the flat surfaces, and are hazardous, because the arms, or other parts thereof, may engage other objects, such as trunks, boxes, handles or clothing. The present invention provides a base plate having edges, under the handle, with a raised handle-protecting part, or parts, between an edge, or edges, of the plate, and an arm, or arms, of the handle, to protect the handle from other objects. So the primary object of the invention is to eliminate, or reduce, the hazard caused by well-known, protruding sprung surface handles.

### Brief Description of The Drawings

[0002] **Fig. 1** is a perspective view.

[0003] **Fig. 2** is a cross-sectional view along the lines 2-2 of **Fig. 1**, showing the spring, and turned-in arms, in the channel of the handle-mounting plate.

[0004] **Fig. 3** is a cross-sectional view along the lines 3-3 of **Fig. 2**, showing the spring, and bearing surfaces, in the

channel of the handle-mounting plate, with the bearing surfaces at least partially surrounding the turned-in arms of the handle.

[0005] **Fig. 4** is a cross-sectional view along the lines 4-4 of **Fig. 3**, showing one end of the spring, in a groove, in the bottom of the handle-mounting plate, between the base plate and the handle-mounting plate.

[0006] **Fig. 5** is a cross-sectional view along the lines 5-5 of **Fig. 3**, showing the other end of the spring connected to a turned-in arm of the handle.

#### Written Description of the Invention

[0007] As best shown in **Fig. 1**, the handle assembly has a base plate 1 having edges 2, 3, 4, 5. The handle assembly also includes a handle 6 having a cross arm 7, first and second side arms 8, 9, and a grip 10, on the cross arm 7. While grip 10 makes it easier to grasp the handle 6, it is not an essential part of the invention, because one could grasp cross arm 7.

**Figs. 2** and **3** show handle 6 also has first and second turned-in, coaxial arms 11, 12, extending inwardly from the first and second side arms 8, 9. While handle 6 is shown, and described, as having arms 7, 8, 9, 11, 12 at right angles, other handle shapes may be used. For example, arms 7, 8, 9 could be a continuous curve.

[0008] A handle-mounting plate 13, on the base plate 1,

is attached thereto by rivets 14, 15, 16, 17, as best shown in **Fig. 1**. However, handle-mounting plate 13, on the base plate 1, may be attached thereto by other means, such as spot welding, or the handle-mounting plate 13 and base plate 1, may be formed contiguously, so the handle-mounting plate 13 can be bent over on the base plate 1, thereby eliminating the need for rivet 14, or spot welding in place of rivet 14. So a handle mounting plate 13, on said base plate 1, includes attachment by rivets, spot welding, or formed contiguously, and bent over on the base plate 1.

[0009] **Figs. 2 and 3** show handle-mounting plate 13 has a channel 18 formed therein, the channel 18 having first and second internal bearing surfaces 19, 20, the first internal bearing surface 19 at least partially surrounding the first turned-in arm 11, and the second internal bearing surface 20 at least partially surrounding the second turned-in arm 12. So the turned-in arms 11, 12 rotate in the internal bearing surfaces 19, 20, to a position in which the handle 6 is adjacent the base plate 1, as shown in **Fig. 1**. In that position, the handle 6 does not contact the base plate, but is near it, separated therefrom by the thickness of the grip 10. A handle 6, without grip 10, would contact the base plate 1, and would be more difficult to grasp. Nevertheless, as used herein, adjacent means near the base plate 1, or in contact with it.

[0010] First and second curved stops 21, 22, shown in Fig. 1, are formed at the ends of the channel 18, in the handle mounting plate 13, so the first curved stop 21 receives the first side arm 8, and the second curved stop 22 receives the second side arm 9, to stop rotation of the handle 6, when it is rotated away from the base plate 1, to an upright position, that is, with the side arms 8, 9 approximately perpendicular to the base plate 1. In this position, the handle transmits a lifting force, on the cross arm 7, or grip 10, to the end of a trunk, or box, through bolts, or rivets, in the holes 23, 24, 25, 26, 27, 28. The lifting force, on the cross arm 7, or grip 10, exerts a torque on the base plate 1 that tends to pull it off the trunk, or box. Opposing torques are exerted by the tensile forces on the rivets, or bolts, in the holes 23, 24, 25, 26, 27, 28, which are equal to the tensile force on each bolt, or rivet, times its lever arm, the distance to its axis of rotation, or the perpendicular distance from the center of each of the holes 23, 24, 25, 26, 27, 28 to the upper edge 5 of the base plate 1. The sum of these opposing torques are equal to the torque caused by the lifting force on the cross arm 7, or grip 10. Since the plate 1 provides much longer lever arms for the bolts, or rivets, in holes 25, 26, 27, 28, than is provided for bolts, or rivets, in the prior art sprung surface handles, the base plate 1 is more secure, and less likely to be loosened, or pulled off the trunk, or box, because the tensile force on each rivet, or bolt, in

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holes 25, 26, 27, 28, is less. While I have described the curved stops 21, 22 as stopping rotation, when the handle is rotated to an upright position, the stops could be formed to stop the rotation at any time after the handle 6 has rotated away from the base plate 1.

[0011] Although curved stops 21, 22 are shown, and described, as formed in the handle-mounting plate 13, they could be formed on the handle-mounting plate 13. So, as used herein, in includes on, and vice versa. Also, while the curved stops 21, 22 are shown, and described, at the end of channel 18, in handle-mounting plate 13, if part of the handle-mounting plate 13, at the end, or ends, of channel 18 are removed, the first curved stop 21, or the second curved stop 22, or both, could be formed on the base plate 1. In addition, although the curved stops 21, 22 are shown, and described, as curved, other shapes could be used, in, or on, the handle-mounting plate 13, or on the base plate 1.

[0012] Raised handle-protecting parts 29, 30, 31, 32 are formed in the base plate 1, by stamping, but could be separate parts, on the base plate 1, attached by bolts, or other means. Raised handle-protecting part 29 is between side arm 8 and edge 2, raised handle-protecting part 30 is between side arm 8 and edge 2, and also between cross arm 7 and edge 3. Likewise, raised handle-protecting part 32 is between side arm 9 and edge 4, and handle-protecting part 31 is between side arm 9 and edge

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4, and also between cross arm 7 and edge 3. While these preferred handle-protecting parts 29, 30, 31, 32 protect the side arms 8, 9, cross arm 7, and grip 10, as well as the corner formed by side arm 8 and cross arm 7, and the corner formed by the side arm 9 and cross arm 7, alternative handle-protecting parts may be used. For example, one handle protecting part could be between cross arm 7 and the edge 3, or one handle-protecting part could be between the side arm 8 and edge 2, or one handle-protecting part could be between the side arm 9 and edge 4, or any combination of two of these handle-protecting parts could be used instead of any one alone, or all three could be used instead of any one, or any two, alone.

[0013] While the preferred handle-protecting parts have a smooth, sloping surface, as shown in **Fig. 1**, other surfaces, without edges, or corners, that will not snag, or catch, on other trunks, boxes, handles, or clothing may be used. Preferably, handle-protecting parts 29, 30, 31, 32 extend from the base plate 1 to at least the top of the cross arm 7, when the handle is adjacent the base plate 1. Obviously, higher, or shorter, handle-protecting parts will also work.

[0014] A coil spring 33 having first and second ends 34, 35, in the channel 18, biases the handle 6 adjacent base plate 1, as shown in **Fig. 1**. The first end 34 of the coil spring 33 is in a groove 36, in the bottom surface of the handle

mounting plate 13, between the base plate 1 and the handle mounting plate 13. The second end 35 of the coil spring 36 fits tightly over an extension 37 of the turned-in arm 12, to bias handle 6 adjacent base plate 1. While the groove 36 is shown, and described, in the bottom surface of handle-mounting plate 13, it could be in the top surface of base plate 1, or first end 34 of the coil spring 33 could otherwise be connected to the base plate 1, or handle-mounting plate 13, and second end 35 of the coil spring 33 could otherwise be connected to the turned-in and 12. Likewise, the handle 6 could be otherwise biased adjacent base plate 1 by a leaf spring.

[0015] Although particular embodiments of the invention have been shown, and described, herein, modifications and variations may readily occur to persons having ordinary skill in the art, and, consequently, it is intended that the claims be interpreted to cover such modifications and equivalents.